

Screening and Behavioral Counseling Interventions to Reduce Unhealthy Alcohol Use in Adolescents and Adults

US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force

IMPORTANCE Excessive alcohol use is one of the most common causes of premature mortality in the United States. From 2006 to 2010, an estimated 88 000 alcohol-attributable deaths occurred annually in the United States, caused by both acute conditions (eg, injuries from motor vehicle collisions) and chronic conditions (eg, alcoholic liver disease). Alcohol use during pregnancy is also one of the major preventable causes of birth defects and developmental disabilities.

OBJECTIVE To update the US Preventive Services Task Force (USPSTF) 2013 recommendation on screening for unhealthy alcohol use in primary care settings.

EVIDENCE REVIEW The USPSTF commissioned a review of the evidence on the effectiveness of screening to reduce unhealthy alcohol use (defined as a spectrum of behaviors, from risky drinking to alcohol use disorder, that result in increased risk for health consequences) morbidity, mortality, or risky behaviors and to improve health, social, or legal outcomes; the accuracy of various screening approaches; the effectiveness of counseling interventions to reduce unhealthy alcohol use, morbidity, mortality, or risky behaviors and to improve health, social, or legal outcomes; and the harms of screening and behavioral counseling interventions.

FINDINGS The net benefit of screening and brief behavioral counseling interventions for unhealthy alcohol use in adults, including pregnant women, is moderate. The evidence is insufficient to assess the balance of benefits and harms of screening and brief behavioral counseling interventions for unhealthy alcohol use in adolescents.

CONCLUSIONS AND RECOMMENDATION The USPSTF recommends screening for unhealthy alcohol use in primary care settings in adults 18 years or older, including pregnant women, and providing persons engaged in risky or hazardous drinking with brief behavioral counseling interventions to reduce unhealthy alcohol use. (B recommendation) The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening and brief behavioral counseling interventions for alcohol use in primary care settings in adolescents aged 12 to 17 years. (I statement)

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The US Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific clinical preventive services for patients without obvious related signs or symptoms.

It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.

Summary of Recommendations and Evidence

The USPSTF recommends screening for unhealthy alcohol use in primary care settings in adults 18 years or older, including pregnant women, and providing persons engaged in risky or hazardous drinking with brief behavioral counseling interventions to reduce unhealthy alcohol use (B recommendation) (Figure 1).

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening and brief behavioral counseling interventions for alcohol use in primary care settings in adolescents aged 12 to 17 years. (I statement)

See the Clinical Considerations section for suggestions for practice regarding the I statement.

Rationale

Importance

The USPSTF uses the term "unhealthy alcohol use" to define a spectrum of behaviors, from risky drinking to alcohol use disorder (AUD) (eg, harmful alcohol use, abuse, or dependence) (Table)¹. "Risky" or "hazardous" alcohol use means drinking more than the recommended daily, weekly, or per-occasion amounts, resulting in increased risk for health consequences but not meeting criteria for AUD.² The National Institute on Alcohol Abuse and Alcoholism (NIAAA) defines "risky use" as exceeding the recommended limits of 4 drinks per day (56 g/d based on the US standard of 14 g/drink) or 14 drinks per week (196 g/d) for healthy adult men aged 21 to 64 years or 3 drinks per day or 7 drinks per week (42 g/d or 98 g/week) for all adult women of any age and men 65 years or older.²

A standard drink is defined as 12.0 oz of beer (5% alcohol), 5.0 oz of wine (12% alcohol), or 1.5 oz of liquor (40% alcohol).² The American Society of Addiction Medicine (ASAM) defines "hazardous use" as alcohol use that increases the risk of future negative health consequences.³ The *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)* defines the severity of AUD (mild, moderate, or severe) based on the number of criteria met.⁴ Previous versions of the *DSM-5* had separate diagnoses for alcohol abuse and alcohol dependence, but it no longer separates these diagnoses.¹ Currently, there is no firm consensus worldwide regarding the definition of risky drinking. In addition, the definition of a standard drink differs by country.¹ Any alcohol use is considered

unhealthy in pregnant women and adolescents.¹ In adolescents, the definition of moderate- or high-risk alcohol use varies by age, based on days of use per year.⁵

Excessive alcohol use is one of the most common causes of premature mortality in the United States. From 2006 to 2010, an estimated 88 000 alcohol-attributable deaths occurred annually in the United States, caused by both acute conditions (eg, injuries from motor vehicle collisions) and chronic conditions (eg, alcoholic liver disease).^{1,6} Alcohol use during pregnancy is also one of the major preventable causes of birth defects and developmental disabilities.⁷

Detection

The USPSTF found adequate evidence that numerous brief screening instruments can detect unhealthy alcohol use with acceptable sensitivity and specificity in primary care settings.

Benefits of Early Detection and Behavioral Counseling Interventions

The USPSTF found no studies that directly evaluated whether screening for unhealthy alcohol use in primary care settings in adolescents and adults, including pregnant women, leads to reduced unhealthy alcohol use; improved risky behaviors; or improved health, social, or legal outcomes.

The USPSTF found adequate evidence that brief behavioral counseling interventions in adults who screen positive are associated with reduced unhealthy alcohol use. There were reductions in both the odds of exceeding recommended drinking limits and heavy use episodes at 6- to 12-month follow-up. In pregnant women, brief counseling interventions increased the likelihood that women remained abstinent from alcohol use during pregnancy. The magnitude of these benefits is moderate. Epidemiologic literature links reductions in alcohol use with reductions in risk for morbidity and mortality and provides indirect support that reduced alcohol consumption may help improve some health outcomes.^{1,8}

The USPSTF found inadequate evidence that brief behavioral counseling interventions in adolescents were associated with reduced alcohol use.

Harms of Screening and Behavioral Counseling Interventions

The USPSTF bounds the harms of screening and brief behavioral counseling interventions for unhealthy alcohol use in adults, including pregnant women, as small to none, based on the likely minimal harms of the screening instruments, the noninvasive nature of the interventions, and the absence of reported harms in the evidence on behavioral interventions. When direct evidence is limited, absent, or restricted to select populations or clinical scenarios, the USPSTF may place conceptual upper or lower bounds on the magnitude of benefit or harms.

The USPSTF found inadequate evidence on the harms of screening and brief behavioral counseling interventions for alcohol use in adolescents.

USPSTF Assessment

The USPSTF concludes with moderate certainty that screening and brief behavioral counseling interventions for unhealthy alcohol use in the primary care setting in adults 18 years or older, including pregnant women, is of moderate net benefit.

Figure 1. USPSTF Grades and Levels of Evidence

What the USPSTF Grades Mean and Suggestions for Practice		
Grade	Definition	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.	Read the Clinical Considerations section of the USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit	
Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by such factors as the number, size, or quality of individual studies. inconsistency of findings across individual studies. limited generalizability of findings to routine primary care practice. lack of coherence in the chain of evidence. As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of the limited number or size of studies. important flaws in study design or methods. inconsistency of findings across individual studies. gaps in the chain of evidence. findings not generalizable to routine primary care practice. lack of information on important health outcomes. More information may allow estimation of effects on health outcomes.
The USPSTF defines certainty as “likelihood that the USPSTF assessment of the net benefit of a preventive service is correct.” The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.	

USPSTF indicates US Preventive Services Task Force.

The USPSTF concludes that the evidence is insufficient to determine the benefits and harms of screening for unhealthy alcohol use in the primary care setting in adolescents aged 12 to 17 years.

Clinical Considerations

Patient Population Under Consideration

The “B” recommendation applies to adults 18 years or older, including pregnant women. The “I” statement applies to adolescents aged

12 to 17 years (Figure 2). These recommendations do not apply to persons who have a current diagnosis of or who are seeking evaluation or treatment for alcohol abuse or dependence.

Screening Tests

Of the available screening tools, the USPSTF determined that 1-item to 3-item screening instruments have the best accuracy for assessing unhealthy alcohol use in adults 18 years or older.¹ These instruments include the abbreviated Alcohol Use Disorders Identification Test–Consumption (AUDIT-C) and the NIAAA-recommended Single Alcohol Screening Question (SASQ).

Table. Terms and Definitions of Unhealthy Alcohol Use

Term	Source	Definition
Low-risk use/lower-risk use	ASAM	Consumption of alcohol below the amount identified as hazardous and in situations not defined as hazardous
Risky/at-risk use	NIAAA	<p>Consumption of alcohol above the recommended daily, weekly, or per-occasion amounts but not meeting criteria for alcohol use disorder</p> <p>For all women and men 65 y or older: No more than 3 drinks/d and no more than 7 drinks/wk</p> <p>For men (21-64 y): No more than 4 drinks/d and no more than 14 drinks/wk</p> <p>Should avoid alcohol completely: Adolescents, women who are pregnant or trying to get pregnant, and adults who plan to drive a vehicle or operate machinery, are taking medication that interacts with alcohol, or have a medical condition that can be aggravated by alcohol</p> <p>For adolescents: NIAAA defines moderate- and high-risk use based on days of alcohol use in the past year, by age group: Moderate risk: Ages 12-15 y: 1 d/y Ages 16-17 y: 6 d/y Age 18 y: 12 d/y Highest risk: Age 11 y: 1 d Ages 12-15 y: 6 d Age 16 y: 12 d Age 17 y: 24 d Age 18 y: 52 d</p>
Unhealthy use	ASAM	Any alcohol use that increases the risk or likelihood of health consequences (hazardous use [see below]) or has already led to health consequences (harmful use [see below])
Hazardous use	WHO	A pattern of substance use that increases the risk of harmful consequences; in contrast to harmful use, hazardous use refers to patterns of use that are of public health significance, despite the absence of a current alcohol use disorder in the individual user
	ASAM	Alcohol use that increases the risk or likelihood of health consequences; does not include alcohol use that has already led to health consequences
Harmful use	WHO	A pattern of drinking that is already causing damage to health; the damage may be either physical (eg, liver damage from chronic drinking) or mental (eg, depressive episodes secondary to drinking)
	ASAM	The description for ICD-10 code F10.1, also labeled "Alcohol Abuse" in the 2018 ICD-10-CM codebook
Alcohol use disorder	ASAM	Consumption of alcohol that results in health consequences in the absence of addiction
	DSM-5	<p>A maladaptive pattern of alcohol use leading to clinically significant impairment or distress, as manifested by 2 (or more) of the following, occurring within a 12-mo period:</p> <ol style="list-style-type: none"> 1. Having times when the patient drank more, or longer, than intended 2. More than once wanted to cut down or stop, tried it, but could not 3. Spending a lot of time drinking or being sick/getting over the aftereffects of drinking 4. Wanting to drink so badly that they could not think of anything else 5. Found that drinking (or being sick from drinking) often interfered with taking care of home or family responsibilities, caused problems at work, or caused problems at school 6. Continuing to drink even though it was causing trouble with family and friends 7. Given up or cut back on activities that were important or interesting in order to drink 8. More than once gotten into situations while or after drinking that increased the chances of getting hurt (eg, driving, swimming, unsafe sexual behavior) 9. Continued to drink even though it was causing depression or anxiety, other health problems, or causing memory blackouts 10. Having to drink much more than previously in order to get the desired effect, or finding that the usual number of drinks had much less effect than previously 11. Experiencing the symptoms of withdrawal after the effects of alcohol were wearing off, such as trouble sleeping, shakiness, restlessness, nausea, sweating, racing heart, or seizure <p>Severity is determined based on the number of symptoms present: Mild: 2-3 symptoms Moderate: 4-5 symptoms Severe: ≥6 symptoms</p>
Binge drinking/heavy drinking episodes ^a	NIAAA	A pattern of drinking that brings blood alcohol concentration levels to 0.08 g/dL, which typically occurs after 4 drinks for women and 5 drinks for men—in about 2 h
	SAMHSA	Drinking ≥5 alcoholic drinks on the same occasion on at least 1 d in the past 30 d
Heavy drinking	SAMHSA	Drinking ≥5 drinks on the same occasion on each of ≥5 d in the past 30 d

(continued)

The abbreviated AUDIT-C has good sensitivity and specificity for detecting the full spectrum of unhealthy alcohol use across multiple populations.¹⁹ The AUDIT-C has 3 questions about frequency of alcohol use, typical amount of alcohol use, and occasions of heavy use, and takes 1 to 2 minutes to administer. The USAUDIT and USAUDIT-C are based on US standards. Preliminary evidence

(1 study) suggests that the USAUDIT (specifically the USAUDIT-C) may be more valuable in identifying at-risk college drinkers.¹⁰ The SASQ also has adequate sensitivity and specificity across the unhealthy alcohol use spectrum and requires less than 1 minute to administer, asking "How many times in the past year have you had 5 [for men] or 4 [for women and all adults older than 65 years]

Table. Terms and Definitions of Unhealthy Alcohol Use (continued)

Term	Source	Definition
Alcohol dependence	WHO/ICD-10-CM	<p>≥3 of the following at some time during the previous year:</p> <ol style="list-style-type: none"> 1. A strong desire or sense of compulsion to take the substance 2. Difficulties in controlling substance-taking behavior in terms of its onset, termination, or levels of use 3. A physiological withdrawal state when substance use has ceased or been reduced, as evidenced by: the characteristic withdrawal syndrome for the substance; or use of the same (or a closely related) substance with the intention of relieving or avoiding withdrawal symptoms 4. Evidence of tolerance, such that increased doses of the psychoactive substance are required in order to achieve effects originally produced by lower doses (clear examples of this are found in alcohol- and opiate-dependent individuals who may take daily doses sufficient to incapacitate or kill nontolerant users) 5. Progressive neglect of alternative pleasures or interests because of psychoactive substance use, increased amount of time necessary to obtain or take the substance, or to recover from its effects 6. Persisting with substance use despite clear evidence of overtly harmful consequences, such as harm to the liver through excessive drinking, depressive mood states consequent to periods of heavy substance use, or drug-related impairment of cognitive functioning; efforts should be made to determine that the user was actually, or could be expected to be, aware of the nature and extent of the harm

Abbreviations: ASAM, American Society of Addiction Medicine; DSM-5, *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*; ICD-10-CM, *International Classification of Diseases, Tenth Revision, Clinical Modification*; NIAAA, National Institute on Alcohol Abuse and

Alcoholism; SAMHSA, Substance Abuse and Mental Health Services Administration; WHO, World Health Organization.

^a According to the American Society of Addiction Medicine, the preferred term is "heavy drinking episode."

Figure 2. Clinical Summary: Screening and Behavioral Counseling Interventions in Primary Care to Reduce Unhealthy Alcohol Use in Adolescents and Adults

Population	Adults, including pregnant women	Adolescents
Recommendation	<p>Screen for unhealthy alcohol use and provide persons engaged in risky or hazardous drinking with brief behavioral counseling interventions.</p> <p>Grade: B</p>	<p>No recommendation.</p> <p>Grade: I (insufficient evidence)</p>

Screening Tests	Numerous brief screening instruments can detect unhealthy alcohol use with acceptable sensitivity and specificity in primary care settings. One- to 3-item screening instruments have the best accuracy for assessing unhealthy alcohol use in adults 18 years or older. These instruments include the AUDIT-C and the SASQ.
Treatments and Interventions	Brief behavioral counseling interventions were found to reduce unhealthy alcohol use in adults 18 years or older, including pregnant women. Effective behavioral counseling interventions vary in their specific components, administration, length, and number of interactions. The USPSTF was unable to identify specific intervention characteristics or components that were clearly associated with improved outcomes.
Relevant USPSTF Recommendations	The USPSTF has made recommendations on screening for and interventions to reduce the unhealthy use of other substances, including illicit drugs and tobacco.

For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, please go to <https://www.uspreventiveservicestaskforce.org>.



AUDIT-C, Alcohol Use Disorders Identification Test-Consumption; SASQ, Single Alcohol Screening Question; USPSTF, US Preventive Services Task Force.

or more drinks in a day?"^{1,2}. The Cut down, Annoyed, Guilty, Eye-opener (CAGE) tool is well known but only detects alcohol dependence rather than the full spectrum of unhealthy alcohol use.^{1,11}

When patients screen positive on a brief screening instrument (eg, SASQ or AUDIT-C), clinicians should ensure follow-up with a more in-depth risk assessment to confirm unhealthy alcohol use and determine the next steps of care. Evidence supports the use of brief instruments with higher sensitivity and lower specificity as initial screening, followed by a longer instrument with greater specificity (eg, AUDIT). The AUDIT has 10 questions: 3 questions covering fre-

quency of alcohol use, typical amount of alcohol use, and occasions of heavy use, and 7 questions on the signs of alcohol dependence and common problems associated with alcohol use (eg, being unable to stop once you start drinking). It requires approximately 2 to 5 minutes to administer.^{1,12} If AUDIT is used as an initial screening test, clinicians may use a lower cutoff (such as 3, 4, or 5) to balance sensitivity and specificity in screening for the full spectrum of unhealthy alcohol use.

Screening instruments have also been specifically developed for various populations. Screening tools for pregnant women

include Tolerance, Worried, Eye-opener, Amnesia, Kut down (TWEAK)¹³; Tolerance, Annoyed, Cut down, Eye-opener (T-ACE)¹⁴; Parents, Partner, Past, Present Pregnancy (4P's Plus)¹⁵; and Normal drinker, Eye-opener, Tolerance (NET).¹⁶ The NIAAA and American Academy of Pediatrics recommend the Car, Relax, Alone, Forget, Family, Friends, Trouble (CRAFFT) screening instrument for identifying risky substance use in adolescents.¹⁷ The NIAAA also recommends asking patients about their own alcohol use as well as their friends' alcohol use.⁵ The Comorbidity Alcohol Risk Evaluation Tool (CARET) is used in older adults.¹⁸ The Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST), developed by the World Health Organization (WHO), screens for substance and alcohol use in adults.^{1,19}

Behavioral Counseling Interventions

Behavioral counseling interventions for unhealthy alcohol use vary in their specific components, administration, length, and number of interactions. Thirty percent of the interventions reviewed by the USPSTF were web-based. Nearly all of the interventions consisted of 4 or fewer sessions; the median number of sessions was 1 (range, 0-21). The median length of time of contact was 30 minutes (range, 1-600 minutes). Most of the interventions had a total contact time of 2 hours or less.¹ Primary care settings often used the Screening, Brief Intervention, and Referral to Treatment (SBIRT) approach. Interventions targeting adults other than college students (including pregnant and postpartum women) were more likely to take place in primary care settings, have multiple sessions, and involve a primary care team.¹ Most interventions involved giving general feedback to participants (eg, how their drinking fits with recommended limits, or how to reduce alcohol use). The most commonly reported intervention component was use of personalized normative feedback sessions, in which participants were shown how their alcohol use compares with that of others; more than half of the included trials and almost all trials in young adults used this technique.¹ Most trials in young adults involved 1 or 2 in-person or web-based personalized normative feedback sessions in university settings. Personalized normative feedback was often combined with motivational interviewing or more extensive cognitive behavioral counseling. Other cognitive behavioral strategies, such as drinking diaries, action plans, alcohol use "prescriptions," stress management, or problem solving were also frequently used. About one-third of the intervention trials in general and older adult populations involved a primary care team.¹ The USPSTF was unable to identify specific intervention characteristics or components that were clearly associated with improved outcomes.¹

The USPSTF found no evidence to suggest that patients of different race/ethnicity or lower socioeconomic status have a lower likelihood of benefit from interventions. Effects of interventions were also similar in men and in women.¹

Screening Intervals

The USPSTF did not find adequate evidence to recommend an optimal screening interval for unhealthy alcohol use in adults.

Suggestions for Practice Regarding the I Statement

Potential Preventable Burden

In 2016, the National Survey on Drug Use and Health reported that an estimated 9.2% of adolescents aged 12 to 17 years drink alcohol

and 4.9% had an episode of binge drinking in the last 30 days.²⁰ Each year, excessive drinking in underage youth leads to more than 4300 deaths.²¹ Driving while under the influence of alcohol is particularly hazardous among adolescents. The 2015 Youth Risk Behavior Survey found that about 8% of high school students who drove a car in the last 30 days reported driving after drinking alcohol, and 20% reported riding with a driver who had been drinking.²² In 2010, 1 in 5 teen drivers involved in a fatal motor vehicle collision had some alcohol in their system, and most had blood alcohol levels higher than the legal limit for adults.²³ An estimated 97 000 students aged 18 to 24 years have reported an alcohol-related sexual assault or date rape; 696 000 students aged 18 to 24 years have been assaulted by another student who was under the influence of alcohol.^{24,25} An estimated 1 in 4 college students report academic consequences from drinking such as missing class, doing poorly on examinations or papers, falling behind in class, and receiving lower grades.^{1,24,26}

Potential Harms

Possible harms of screening for unhealthy alcohol use include stigma, anxiety, labeling, discrimination, privacy concerns, and interference with the patient-clinician relationship. The USPSTF did not find any evidence that specifically examined the harms of screening for alcohol use in adolescents.

Current Practice

Research suggests that although a majority of pediatricians and family practice clinicians report providing some alcohol prevention services to adolescent patients, they do not consistently screen and counsel for alcohol misuse.²⁷ Survey results indicate that screening was more likely if adolescents were older (aged 15 to 17 years).²⁷ However, the quality of screening practices, tools used, and interventions provided varied widely. Current data on rates of screening are lacking. Reported barriers to screening include time constraints, lack of knowledge about best practices, and lack of services for adolescent patients who screen positive.^{1,28}

Useful Resources

The AUDIT and AUDIT-C, which screen for unhealthy alcohol use in adults 18 years or older, including pregnant women, are available from the Substance Abuse and Mental Health Service Administration (SAMHSA), as well as other resources.^{29,30} More information about SASQ and counseling for unhealthy alcohol use is available from the NIAAA.³¹ Clinician guides are available from the WHO³² and the American Academy of Family Physicians.³³ An implementation guide for primary care practices is available from the Centers for Disease Control and Prevention.³⁴

The Community Preventive Services Task Force recommends electronic screening and brief interventions to reduce excessive alcohol consumption in adults. It found limited information on the effectiveness of electronic screening and brief interventions in adolescents.³⁵ The Community Preventive Services Task Force has also evaluated public health interventions (ie, interventions occurring outside of the clinical practice setting) to prevent excessive alcohol consumption.³⁶

The USPSTF has made recommendations on screening for and interventions to reduce the unhealthy use of other substances, including illicit drugs³⁷ and tobacco.³⁸

Other Considerations

Research Needs and Gaps

The USPSTF has identified several research gaps. Although difficult, conducting a trial with an unscreened comparison group to understand the population-level effects of screening in primary care settings would be valuable. More direct evidence is needed on the harms associated with screening and behavioral interventions. The USPSTF found a preliminary study that evaluated the USAUDIT and USAUDIT-C, recent US adaptations of the AUDIT and AUDIT-C. Further test performance studies are needed to confirm their accuracy in identifying unhealthy alcohol use in various populations. More evidence on important clinical outcomes is needed, such as longer-term morbidity, mortality, health care utilization, and social and legal outcomes. Trials designed a priori to report subgroup effects in diverse populations (eg, by age, sex, race/ethnicity, or baseline severity) would be useful. Limited evidence is available to assess the effects of screening and behavioral counseling in adolescents, and high-quality studies specifically addressing this population are needed. In addition, studies in adolescents are often conducted in school settings, which may not translate to primary care settings. More studies of adolescents in primary care settings are needed.

Discussion

Burden of Disease

High-risk drinking increased by almost 30% between 2001-2002 and 2012-2013.²⁶ In 2016, an estimated 26.2% of adults 18 years or older reported heavy-use (binge drinking) episodes and 6.6% reported heavy drinking within the previous month²⁰; an estimated 7.8% of men and 4.2% of women met the criteria for AUD.²⁰ Unhealthy alcohol use is the third-leading preventable cause of death in the United States.^{6,39,40} One of 10 deaths among adults aged 20 to 64 years can be attributed to excessive alcohol use.^{6,39,40} In the United States, from 2006 to 2010, an estimated 88 000 deaths each year were attributed to alcohol use, with an estimated 2.5 million years of potential life lost.⁶ Of these 88 000 deaths, 44% were from chronic conditions (eg, alcoholic liver disease) and 56% were from acute conditions (eg, injuries from motor vehicle collisions).⁶ Excessive alcohol use also contributed to 3.2% to 3.7% of cancer deaths, including breast, gastrointestinal, oral cavity, and neck cancer.⁴¹ Among adolescents aged 12 to 17 years, 9.2% reported being current alcohol users and 4.9% reported heavy use episodes in the previous month. Approximately 488 000 adolescents have AUD (2.4% and 1.5% of female and male adolescents, respectively).²⁰ In 2005, unhealthy alcohol use in college students aged 18 to 24 years contributed to an estimated death of 1825 students through unintentional injuries (eg, motor vehicle collisions),^{25,42} and about 1 in 4 students report that alcohol use contributes to missing or falling behind in classes, low grades, and poor performance on examinations and papers.^{25,42} In 2010, excessive alcohol use cost the United States an estimated \$249 billion in loss in workplace productivity, health care expenses, criminal justice expenses, and motor vehicle collisions.⁴³ Alcohol use during pregnancy can result in preterm birth and low birth weight. It is a major preventable cause of birth defects and developmental disabilities, including fetal alcohol spectrum disor-

ders, and affects development of the fetal brain, endocrine system, gastrointestinal tract, heart, kidney, and liver.⁷ The 2011-2013 Behavioral Risk Factor Surveillance System survey shows that 1 in 10 pregnant women aged 18 to 44 years reported consuming alcohol in the previous month, and 3.1% participated in binge drinking.⁴⁴

Scope of Review

The USPSTF commissioned a systematic evidence review to update its 2013 recommendation on screening for unhealthy alcohol use in primary care. In the previous recommendation, the USPSTF used the term "alcohol misuse" to define a wide range of drinking behaviors (eg, risky or hazardous alcohol use, harmful alcohol use, and alcohol abuse or dependence).⁴⁵ In accordance with the ASAM, the current recommendation uses the term "unhealthy use" rather than "misuse." The ASAM defines "unhealthy use" as any use of alcohol that increases the risk of health consequences or that has already led to health consequences, including an AUD diagnosis.^{1,4} The evidence review examined the effectiveness of screening to reduce unhealthy alcohol use, morbidity, mortality, or risky behaviors and to improve health, social, or legal outcomes; the accuracy of various screening approaches; the effectiveness of counseling interventions to reduce unhealthy alcohol use, morbidity, mortality, or risky behaviors and to improve health, social, or legal outcomes; and the harms of screening and behavioral counseling interventions. The review did not include treatment with medications because medications are used to treat severe AUD and are not routinely used in screen-detected persons. Interventions to prevent alcohol use in adolescents was determined to be out of scope for this review.¹

Accuracy of Screening Tests

Forty-five studies (n = 277 881) addressed the accuracy of screening tools; 10 studies in adolescents, 5 in young adults, 27 in general adult populations, 1 in older adults, and 2 in pregnant or postpartum women. Twenty-eight studies were fair quality and 17 were good quality. Most studies took place in the United States (62%), and 51% of the studies recruited patients from primary care settings.¹

Studies evaluated AUDIT, AUDIT-C, ASSIST, and a variety of 1- or 2-item screening tests for detecting the full spectrum of unhealthy alcohol use. Screening instruments addressed a variety of elements, such as quantity of drinks, drinking frequency, or typical total number of drinks over a specific period (quantity × frequency), and a variety of response categories and cutoffs.¹

Reference standards were structured diagnostic interviews (eg, Composite International Diagnostic Interview, Alcohol Use Disorder and Associated Disabilities Interview Schedule, or Mini International Neuropsychiatric Interview Plus). Some studies used a diagnostic interview in combination with other instruments (eg, in combination with the ASSIST, to identify the full spectrum of unhealthy alcohol use) or a timeline follow-back interview.¹

For adults, the AUDIT, AUDIT-C, and 1- or 2-item screening tests had acceptable sensitivity and specificity to detect the full spectrum of unhealthy alcohol use. Studies of the SASQ reported sensitivity of 0.73 to 0.88 (95% CI range, 0.65-0.89) and specificity of 0.74 to 1.00 (95% CI range, 0.69-1.00) for detecting unhealthy alcohol use (4 studies [n = 44 461]). Other 1- or 2-item screening tests generally showed sensitivity of 0.70 or greater. The standard of 6 or more drinks per occasion tended to have decreased sensitivity compared with the standard of 5 (men)/4 (women) or more drinks,

often with nonoverlapping confidence intervals. Other adult populations (young adults, older adults, and pregnant women) had similar results.¹

Seven studies (n = 8852) evaluating the AUDIT for the detection of unhealthy alcohol use in general adult populations, using the recommended cutoff of higher than 8, reported a wide range of sensitivity (0.38-0.73 [95% CI, 0.33-0.84]) but high specificity (0.89-0.97 [95% CI, 0.84-0.98]). In many studies, sensitivity improved at lower cutoffs. Three studies (n = 2782) conducted in US primary care settings showed better accuracy (sensitivity, 0.64-0.86 [95% CI, 0.57-0.91] and specificity, 0.74-0.94 [95% CI, 0.68-0.95] at cutoffs of 3, 4, or 5).¹

Sensitivity of the AUDIT-C for detecting unhealthy alcohol use in adults was similar to that of 1- or 2-item screening instruments. In most studies, the range of sensitivity was 0.73 to 0.97 for females (95% CI, 0.62-0.99; 5 studies [n = 2714]) and 0.82 to 1.00 for males (95% CI, 0.75-1.00; 4 studies [n = 1038]) at the standard cutoffs of 3 or higher (female) and 4 or higher (male), but the range of specificity was much wider (0.28-0.91 [95% CI, 0.21-0.93] and 0.34-0.89 [95% CI, 0.25-0.92] for females and males, respectively). Evidence on the use of the AUDIT-C in younger adults, older adults, and pregnant women was lacking.¹

Pregnant Women

No studies among pregnant women reported on the test accuracy of any screening test for alcohol use or the full spectrum of unhealthy alcohol use (eg, AUDIT-C, AUDIT, ASSIST, TWEAK, or T-ACE).¹

A study in American Indian women reported the test accuracy of 1- or 2-item screening instruments (quantity × frequency) to screen for any alcohol use during pregnancy. At the optimal cutoff, sensitivity was 0.77 (95% CI, 0.68-0.83) and specificity was 0.93 (95% CI, 0.86-0.96).⁴⁶

Adolescents

Although multiple studies among adolescents demonstrated good accuracy of 1- or 2-item screening instruments and the AUDIT for detecting AUD, none reported on test accuracy for screening for the full spectrum of unhealthy alcohol use.¹ Only 1 study evaluated the accuracy of detecting unhealthy alcohol use in adolescents. One study (n = 225) in a German high school reported on the test accuracy of the AUDIT-C for detecting the full spectrum of unhealthy alcohol use (males and females combined), with a sensitivity of 0.73 (95% CI, 0.60-0.83) and a specificity of 0.81 (95% CI, 0.74-0.86) at the optimal cutoff of 5 or higher.⁴⁷ Evidence to determine whether brief (1- to 3-item) screening instruments or the AUDIT can detect alcohol use in adolescents was lacking.¹

Effectiveness of Screening and Behavioral Counseling Interventions

No trials examined the direct effects of screening for unhealthy alcohol use on alcohol use or health, social, or legal outcomes.

Alcohol Use and Other Risky Behaviors

Ten good-quality trials and 58 fair-quality trials (n = 36 528) reported on alcohol use and other risky behaviors. The majority of trials (60%) were conducted in the United States. Intervention settings were predominantly in primary care clinics (62%).¹ Two trials were in adolescents, 22 in college-aged or young adults, 29 in general adult

populations, 4 in older adults, and 11 in pregnant or postpartum women.¹ Trials were generally limited to study participants who reported a prespecified level of alcohol use on a screening instrument such as the AUDIT. Outcomes were generally reported at 6- to 12-month follow-up or during the late pregnancy/early postpartum period for abstinence during pregnancy. Trials demonstrated high heterogeneity; effect size was not clearly associated with any intervention characteristics. Data on effectiveness in important subpopulations were very limited.¹ The most commonly reported subpopulation analysis (by sex) did not show differences in the effectiveness of the interventions.¹ The most commonly reported alcohol use outcome was number of drinks per week. Among 37 adult trials (n = 15 974), adults in intervention groups reduced the number of drinks per week more than adults in control groups (weighted mean difference between groups in change from baseline, -1.59 [95% CI, -2.15 to -1.03; $I^2 = 63\%$). The proportion exceeding recommended drinking limits was reduced (odds ratio [OR], 0.60 [95% CI, 0.53 to 0.67]), as well as the proportion reporting a heavy-use episode (OR, 0.67 [95% CI, 0.58 to 0.77]). Analyses limited to trials conducted in US primary care settings suggest that effects in the most applicable trials were comparable or larger than the overall effect (weighted mean difference, -2.82 [95% CI, -3.87 to -1.76]).¹

Interventions among adults resulted in an absolute increase of 14% more participants drinking within recommended limits, meaning 7 adults would need to be treated to achieve 1 adult drinking within recommended limits (number needed to treat, 7.2 [95% CI, 6.2 to 11.5]).¹

Interventions increased the proportion of pregnant women reporting abstinence (OR, 2.26 [95% CI, 1.43 to 3.56]). Based on these results, interventions doubled the odds that women remained abstinent from alcohol during pregnancy (number needed to treat, 6.0 [95% CI, 4.3 to 12.5]).¹ Evidence on the effects of interventions to reduce unhealthy alcohol use in adolescents was limited to 2 trials; both found mixed results for reduced alcohol use.¹

Benefits continued 24 months or beyond in 4 of 7 trials with longer-term outcomes. Very limited data suggest that benefits from alcohol use interventions can be maintained over 2 to 4 years, including the number of drinks per week and some health outcomes.¹ However, several trials in younger adults found that beneficial effects appeared at 6 months but were no longer statistically significant at 12 months, suggesting that beneficial effects may deteriorate more quickly in younger adults.¹

Few changes in other behavioral outcomes (eg, drug use, sex after alcohol use, and seeking help for unhealthy alcohol use) were either observed or were rarely reported.¹

Health, Social, and Legal Outcomes

Forty-one good- and fair-quality trials (n = 20 324) reported health, social, and legal outcomes; however, no particular outcomes were commonly reported. In addition, reported outcomes were generally not statistically significant and inconsistently favored the intervention group.¹ In adults, 8 trials reported a statistically nonsignificant reduction in all-cause mortality (OR, 0.64 [95% CI, 0.34 to 1.19]).¹ One good-quality study showed reductions in emergency department visits and controlled substance or liquor violations at 4-year follow-up.⁴⁸ Trials in young adults demonstrated a small reduction in alcohol-related consequences (standardized mean difference, -0.06 [95% CI, -0.11 to -0.01]).¹

Potential Harms of Screening and Behavioral Counseling Interventions

Potential harms of screening include stigma, labeling, discrimination, privacy concerns, and interference with the patient-clinician relationship.¹ In addition, there may be legal concerns for pregnant women in some states.⁴⁹ No studies evaluated the harms of screening for unhealthy alcohol use.

One possible harm of behavioral counseling interventions could be an unexpected paradoxical increase in alcohol consumption. One good-quality and 5 fair-quality trials (n = 3650) reported on harms. There was very limited evidence on intervention harms.¹ Interventions reviewed and discussed above generally reported benefits, including reductions in alcohol consumption. Therefore, paradoxical and theoretical increases in alcohol use with interventions are unlikely.¹

Estimate of Magnitude of Net Benefit

Adequate evidence supports a moderate beneficial effect of screening for unhealthy alcohol use followed by brief behavioral counseling interventions in adults. Screening and behavioral counseling interventions in the primary care setting can reduce unhealthy drinking behaviors in adults, including heavy episodic drinking, high daily or weekly levels of alcohol consumption, and exceeding recommended drinking limits. Although the USPSTF found limited specific evidence for pregnant women, it determined that available studies of behavioral counseling interventions for unhealthy alcohol use in pregnant women supported increased likelihood of alcohol abstinence during pregnancy with intervention.

Available studies have not focused on the effects of screening and behavioral counseling interventions on longer-term health outcomes, such as alcohol-related disease or death. However, adequate epidemiologic evidence links reduced levels of alcohol consumption with a reduced risk for morbidity and mortality, providing indirect support that behavioral counseling interventions that reduce acute and sustained alcohol intake levels can help improve some health outcomes of unhealthy alcohol use.⁸ A large body of observational evidence also links alcohol use in pregnant women with an increased risk for subsequent birth defects, such as fetal alcohol spectrum disorders.^{50,51}

Given the noninvasive nature of screening and behavioral counseling interventions for unhealthy alcohol use, the USPSTF determined the magnitude of harms to be small to none in adults and pregnant women. Therefore, the USPSTF concludes with moderate certainty that the net benefit of screening and brief behavioral counseling interventions for unhealthy alcohol use in adults, including pregnant women, is moderate.

Evidence in adolescents is limited. As such, the USPSTF concludes that the evidence is insufficient to assess the balance of benefits and harms of screening and brief behavioral counseling interventions for unhealthy alcohol use in adolescents.

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF website from June 5, 2018, to July 2, 2018. Some comments expressed concerns about the lack of discussion of specific populations. In response, the USPSTF added language about the harms of alcohol consumption in adolescents to the Clinical Considerations section and the harms of alcohol use during pregnancy to the Discussion section. The USPSTF also added more useful resources to the Clinical Considerations section. Some comments requested clarification on which screening tools were being discussed; the USPSTF clarified this by adding references.

Update of Previous Recommendation

This recommendation replaces the 2013 USPSTF recommendation statement on screening and behavioral counseling interventions for alcohol misuse. The term "alcohol misuse," used in the 2013 recommendation, has been replaced by the term "unhealthy alcohol use."

Recommendations of Others

The US Surgeon General,⁵² NIAAA,² Centers for Disease Control and Prevention,³⁴ and ASAM⁵³ recommend routinely screening adult patients for unhealthy alcohol use and providing them with appropriate interventions, if needed. The US Department of Veterans Affairs recommends annual screening with the AUDIT-C and SASQ.⁵⁴ The American Academy of Pediatrics recommends screening all adolescent patients for alcohol use with a formal, validated screening tool (such as the CRAFFT) at every health supervision visit and appropriate acute care visits, and responding to screening results with the appropriate brief intervention and referral if indicated. Pediatricians should become familiar with adolescent SBIRT approaches and their potential for incorporation into universal screening and comprehensive care of adolescents in the medical home.⁵⁵ The American College of Obstetricians and Gynecologists⁵⁶ and WHO⁵⁷ recommend screening all women for unhealthy alcohol use before pregnancy and in their first trimester with a validated tool, and offering a brief intervention to all pregnant women who use alcohol.

ARTICLE INFORMATION

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REFERENCES

- O'Connor EA, Perdue LA, Senger CA, et al. *Screening and Behavioral Counseling Interventions in Primary Care to Reduce Unhealthy Alcohol Use in Adolescents and Adults: Updated Systematic Review for the US Preventive Services Task Force: Evidence Synthesis No. 171*. Rockville, MD: Agency for Healthcare Research and Quality; 2018. AHRQ publication 18-05242-EF-1.
- National Institute on Alcohol Abuse and Alcoholism (NIAAA). *Helping Patients Who Drink Too Much: A Clinician's Guide*. NIAAA website. <https://www.niaaa.nih.gov/guide>. Published 2005. Accessed October 1, 2018.
- American Society of Addiction Medicine (ASAM). *Terminology Related to the Spectrum of Unhealthy Substance Use*. ASAM website. <https://www.asam.org/advocacy/find-a-policy-statement/view-policy-statement/public-policy-statements/2014/08/01/terminology-related-to-the-spectrum-of-unhealthy-substance-use>. Published 2013. Accessed October 1, 2018.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington, VA: American Psychiatric Association; 2013.
- National Institute on Alcohol Abuse and Alcoholism (NIAAA). *Alcohol Screening and Brief Intervention for Youth: A Practitioner's Guide*. NIAAA website. <https://www.niaaa.nih.gov/publications/clinical-guides-and-manuals/alcohol-screening-and-brief-intervention-youth>. Published 2011. Accessed October 1, 2018.
- Stahre M, Roeber J, Kanny D, Brewer RD, Zhang X. Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. *Prev Chronic Dis*. 2014;11:E109. doi:10.5888/pcd11.130293
- Ismail S, Buckley S, Budacki R, Jabbar A, Gallicano GI. Screening, diagnosing and prevention of fetal alcohol syndrome: is this syndrome treatable? *Dev Neurosci*. 2010;32(2):91-100. doi:10.1159/000313339
- Roerecke M, Gual A, Rehm J. Reduction of alcohol consumption and subsequent mortality in alcohol use disorders: systematic review and meta-analysis. *J Clin Psychiatry*. 2013;74(12):e1181-e1189. doi:10.4088/JCP13r08379
- Bush K, Kivlahan DR, McDonell MB, Fihn SD, Bradley KA; Ambulatory Care Quality Improvement Project (ACQUIP). The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. *Arch Intern Med*. 1998;158(16):1789-1795. doi:10.1001/archinte.158.16.1789
- Madson MB, Schutts JW, Jordan HR, Villarosa-Hurlock MC, Whitley RB, Mohn RS. Identifying at-risk college student drinkers with the AUDIT-US: a receiver operating characteristic curve analysis [published online August 21, 2018]. *Assessment*. 2018;1073191118792091. doi:10.1177/1073191118792091
- Samet JH, O'Connor PG. Alcohol abusers in primary care: readiness to change behavior. *Am J Med*. 1998;105(4):302-306. doi:10.1016/S0002-9343(98)00258-7
- Babor TF, Higgins-Biddle JC, Saunders JB, Monteiro MG. *AUDIT: The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Care*. 2nd ed. Geneva, Switzerland: World Health Organization; 2001.
- Russell M, Bigler L. Screening for alcohol-related problems in an outpatient obstetric-gynecologic clinic. *Am J Obstet Gynecol*. 1979;134(1):4-12. doi:10.1016/0002-9378(79)90787-7
- Sokol RJ, Martier SS, Ager JW. The T-ACE questions: practical prenatal detection of risk-drinking. *Am J Obstet Gynecol*. 1989;160(4):863-868. doi:10.1016/0002-9378(89)90302-5
- Chasnoff IJ, McGourty RF, Bailey GW, et al. The 4P's Plus screen for substance use in pregnancy: clinical application and outcomes. *J Perinatol*. 2005;25(6):368-374. doi:10.1038/sj.jp.7211266
- Bottoms SF, Martier SS, Sokol RJ. Refinements in screening for risk drinking in reproductive-aged women: the "NET" results. *Alcohol Clin Exp Res*. 1989;13:339.
- Knight JR, Shrier LA, Bravender TD, Farrell M, Vander Bilt J, Shaffer HJ. A new brief screen for adolescent substance abuse. *Arch Pediatr Adolesc Med*. 1999;153(6):591-596. doi:10.1001/archpedi.153.6.591
- Fink A, Morton SC, Beck JC, et al. The alcohol-related problems survey: identifying hazardous and harmful drinking in older primary care patients. *J Am Geriatr Soc*. 2002;50(10):1717-1722. doi:10.1046/j.1532-5415.2002.50467.x
- Humeniuk R, Henry-Edwards S, Ali R, Poznyak V, Monteiro M. *The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): Manual for Use in Primary Care*. Geneva, Switzerland: World Health Organization; 2010.
- Substance Abuse and Mental Health Administration (SAMHSA). Results from the 2016 National Survey on Drug Use and Health: detailed tables. SAMHSA website. <https://www.samhsa.gov/data/report/results-2016-national-survey-drug-use-and-health-detailed-tables>. 2017. Accessed October 1, 2018.
- Centers for Disease Control and Prevention (CDC). Fact sheets—underage drinking. CDC website. <https://www.cdc.gov/alcohol/fact-sheets/underage-drinking.htm>. Updated August 2, 2018. Accessed October 1, 2018.
- Kann L, McManus T, Harris WA, et al. Youth risk behavior surveillance—United States, 2015. *MMWR Surveill Summ*. 2016;65(6):1-174. doi:10.15585/mmwr.ss6506a1
- Centers for Disease Control and Prevention (CDC). Teen drinking and driving: a dangerous mix. CDC website. <https://www.cdc.gov/vitalsigns/teendrinkinganddriving/index.html>. October 2012. Accessed October 1, 2018.
- National Institute on Alcohol Abuse and Alcoholism (NIAAA). Alcohol facts and statistics. NIAAA website. <https://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/alcohol-facts-and-statistics>. Updated August 2018. Accessed October 1, 2018.
- Hingson R, Heeren T, Winter M, Wechsler H. Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18-24: changes from 1998 to 2001. *Annu Rev Public Health*. 2005;26:259-279. doi:10.1146/annurev.publhealth.26.021304.144652
- Wechsler H, Dowdall GW, Maenner G, Gledhill-Hoyt J, Lee H. Changes in binge drinking and related problems among American college students between 1993 and 1997: results of the Harvard School of Public Health College Alcohol Study. *J Am Coll Health*. 1998;47(2):57-68. doi:10.1080/07448489809595621
- Millstein SG, Marcell AV. Screening and counseling for adolescent alcohol use among primary care physicians in the United States. *Pediatrics*. 2003;111(1):114-122. doi:10.1542/peds.111.1.114
- Van Hook S, Harris SK, Brooks T, et al; New England Partnership for Substance Abuse Research. The "Six T's": barriers to screening teens for substance abuse in primary care. *J Adolesc Health*. 2007;40(5):456-461. doi:10.1016/j.jadohealth.2006.12.007
- Substance Abuse and Mental Health Administration (SAMHSA)-Health Resources and Services Administration (HRSA) Center for Integrated Health Solutions. Screening tools. SAMHSA website. <https://www.integration.samhsa.gov/clinical-practice/screening-tools>. Accessed October 1, 2018.
- Substance Abuse and Mental Health Administration (SAMHSA). Alcohol. SAMHSA website. <https://www.samhsa.gov/atod/alcohol>. Accessed October 1, 2018.
- National Institute on Alcohol Abuse and Alcoholism (NIAAA). Professional education

- materials. NIAAA website. <https://www.niaaa.nih.gov/publications/clinical-guides-and-manuals>. Accessed October 1, 2018.
32. Humeniuk R, Henry-Edwards S, Ali R, Poznyak V, Monteiro M. *The ASSIST-Linked Brief Intervention for Hazardous and Harmful Substance Use: A Manual for Use in Primary Care*. Geneva, Switzerland: World Health Organization; 2010.
33. American Academy of Family Physicians (AAFP). Addressing Alcohol Use Practice Manual: An Alcohol Screening and Brief Intervention Program. AAFP website. https://www.aafp.org/dam/AAFP/documents/patient_care/alcohol/alcohol-manual.pdf. Accessed October 1, 2018.
34. Centers for Disease Control and Prevention (CDC). Planning and Implementing Screening and Brief Intervention for Risky Alcohol Use: A Step-by-Step Guide for Primary Care Practices. CDC website. <https://www.cdc.gov/ncbddd/fasd/documents/alcoholsbiiimplementationguide.pdf>. Published 2014. Accessed October 1, 2018.
35. Community Preventive Services Task Force. Alcohol-excessive consumption: electronic screening and brief interventions (e-SBI). The Community Guide website. <https://www.thecommunityguide.org/findings/alcohol-excessive-consumption-electronic-screening-and-brief-interventions-e-sbi>. August 2012. Accessed October 1, 2018.
36. Community Preventive Services Task Force. Excessive alcohol consumption. The Community Guide website. <https://www.thecommunityguide.org/topic/excessive-alcohol-consumption>. Accessed October 1, 2018.
37. Moyer VA; U.S. Preventive Services Task Force. Primary care behavioral interventions to reduce illicit drug and nonmedical pharmaceutical use in children and adolescents: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2014;160(9):634-639. doi:10.7326/M14-0334
38. Siu AL; U.S. Preventive Services Task Force. Behavioral and pharmacotherapy interventions for tobacco smoking cessation in adults, including pregnant women: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2015;163(8):622-634. doi:10.7326/M15-2023
39. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA*. 2004;291(10):1238-1245. doi:10.1001/jama.291.10.1238
40. O'Connor EA, Perdue LA, Senger CA, et al. Screening and behavioral counseling interventions to reduce unhealthy alcohol use in adolescents and adults: updated evidence report and systematic review for the US Preventive Services Task Force [published November 13, 2018]. *JAMA*. doi:10.1001/jama.2018.12086
41. Nelson DE, Jarman DW, Rehm J, et al. Alcohol-attributable cancer deaths and years of potential life lost in the United States. *Am J Public Health*. 2013;103(4):641-648. doi:10.2105/AJPH.2012.301199
42. Hingson RW, Zha W, Weitzman ER. Magnitude of and trends in alcohol-related mortality and morbidity among U.S. college students ages 18-24, 1998-2005. *J Stud Alcohol Drugs Suppl*. 2009;(16):12-20. doi:10.15288/jsads.2009.s16.12
43. Sacks JJ, Gonzales KR, Bouchery EE, Tomedi LE, Brewer RD. 2010 national and state costs of excessive alcohol consumption. *Am J Prev Med*. 2015;49(5):e73-e79. doi:10.1016/j.amepre.2015.05.031
44. Tan CH, Denny CH, Cheal NE, Sniezek JE, Kanny D. Alcohol use and binge drinking among women of childbearing age—United States, 2011-2013. *MMWR Morb Mortal Wkly Rep*. 2015;64(37):1042-1046. doi:10.15585/mmwr.mm6437a3
45. Moyer VA; Preventive Services Task Force. Screening and behavioral counseling interventions in primary care to reduce alcohol misuse: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2013;159(3):210-218.
46. Bull LB, Kvigne VL, Leonardson GR, Lacinia L, Welty TK. Validation of a self-administered questionnaire to screen for prenatal alcohol use in Northern Plains Indian women. *Am J Prev Med*. 1999;16(3):240-243. doi:10.1016/S0749-3797(98)00158-5
47. Rumpf HJ, Wohlert T, Freyer-Adam J, Grothues J, Bischof G. Screening questionnaires for problem drinking in adolescents: performance of AUDIT, AUDIT-C, CRAFFT and POSIT. *Eur Addict Res*. 2013;19(3):121-127. doi:10.1159/000342331
48. Fleming MF, Barry KL, Manwell LB, Johnson K, London R. Brief physician advice for problem alcohol drinkers: a randomized controlled trial in community-based primary care practices. *JAMA*. 1997;277(13):1039-1045. doi:10.1001/jama.1997.03540370029032
49. Drabble L, Thomas S, O'Connor L, Roberts SC. State responses to alcohol use and pregnancy: findings from the Alcohol Policy Information System (APIS). *J Soc Work Pract Addict*. 2014;14(2):191-206. doi:10.1080/1533256X.2014.900409
50. Henderson J, Kesmodel U, Gray R. Systematic review of the fetal effects of prenatal binge-drinking. *J Epidemiol Community Health*. 2007;61(12):1069-1073. doi:10.1136/jech.2006.054213
51. Sokol RJ, Delaney-Black V, Nordstrom B. Fetal alcohol spectrum disorder. *JAMA*. 2003;290(22):2996-2999. doi:10.1001/jama.290.22.2996
52. US Surgeon General. Preventing drug abuse and excessive alcohol use. SurgeonGeneral.gov website. <https://www.surgeongeneral.gov/priorities/prevention/strategy/preventing-drug-abuse-excessive-alcohol-use.html>. Accessed October 1, 2018.
53. American Society of Addiction Medicine (ASAM). Public policy statement on screening for addiction in primary care settings. ASAM website. <https://www.asam.org/docs/default-source/public-policy-statements/1screening-for-addiction-rev-10-97.pdf?sfvrsn=0>. Accessed October 1, 2018.
54. US Department of Veterans Affairs (VA). VA/DoD Clinical Practice Guidelines: Management of Substance Use Disorder (SUD). VA website. <https://www.healthquality.va.gov/guidelines/mh/sud/>. Published 2015. Accessed October 1, 2018.
55. Committee on Substance Use and Prevention. Substance use screening, brief intervention, and referral to treatment [published online June 20, 2016]. *Pediatrics*. doi:10.1542/peds.2016-1211
56. American College of Obstetricians and Gynecologists. Committee on Health Care for Underserved Women. Committee Opinion No. 496: at-risk drinking and alcohol dependence: obstetric and gynecologic implications. *Obstet Gynecol*. 2011;118(2, pt 1):383-388.
57. World Health Organization. *Guidelines for the Identification and Management of Substance Use and Substance Use Disorders in Pregnancy*. Geneva, Switzerland: World Health Organization; 2014.